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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/233,377	01/18/1999	GURTEJ S. SANDHU	MI22-1114	7580

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EXAMINER

PHAM, THANHHA S

ART UNIT PAPER NUMBER

2813

DATE MAILED: 07/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/233,377

Applicant(s)

SANDHU ET AL.

Examiner

Thanhha Pham

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspond nc address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 24,45,52-61 and 71-73 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 24,45,52-61 and 71-73 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

This Office Action responds to Applicant's Amendment in Paper No 29 dated 6/2/03.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

- 1. Claims 71-73 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

In claim 71, line 10, "the refractory metal comprising a first crystalline phase" lacking antecedent basis should be changed to "the refractory metal silicide comprising the first crystalline phase"

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

- 2. Claims 24, 52-54 and 59-61 are rejected under 35 U.S.C. 102(b) as being anticipated by Ma et al [“Manipulation of the Ti/Si reaction path by introducing an**

**amorphous Ge interlayer', 4<sup>th</sup> international conference on Solid-state and Integrated circuit technology Proceedings, 1995, pp 35-37].**

➤ With respect to claims 24, 53 and 59, Ma et al, figs 1-3 and text pages 35-37, discloses a claimed method of forming a refractory metal silicide layer comprising:

forming a titanium metal layer over a silicon containing substrate (text page 35, Experimental Details, lines 5-7);

after forming the titanium metal layer, providing compressive stress inducing atoms comprising germanium into the titanium metal layer, the compressive stress inducing atoms (Ge) being larger than Si atoms (fig 2a, Results and Discussion, lines 1-18);

first annealing the titanium metal layer containing the compressive stress inducing atoms to form a titanium silicide layer substantially comprising a first crystalline phase after providing compressive stress inducing atoms (fig 2b, Results and Discussion, lines 18-27); and

second annealing the titanium silicide layer substantially comprising the first crystalline phase under conditions effective to transform the titanium silicide layer to a denser layer substantially comprising a second crystalline phase (fig 2c, Results and Discussion, lines 28-41).

➤ With respect to claims 52 and 54, Ma et al (figs 2b and 2c) discloses the first crystalline phase is C49 and the second crystalline phase is C54.

➤ With respect to claim 60, Ma et al (fig 2b ) discloses the first annealing the titanium metal layer to form C49 crystalline phase.

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➤ With respect to claim 61, Ma et al (fig 2c) discloses the second annealing the first crystalline phase to form C54 second crystalline phase.

**3. Claims 45, 55-58 and 71-73 are rejected under 35 U.S.C. 102(a) as being anticipated by Kawamura et al [JP 08-139056].**

➤ With respect to claims 45, 56, and 71-72, Kawamura et al, figs 1's and text paragraph [0001]-[0074], discloses a method of forming a refractory metal silicide comprising:

forming a compressive stress inducing material layer comprising material chosen from a group consisting of silicon nitride and silicon dioxide (gate insulating film being of silicon dioxide, fig 1A, text paragraph [0030]-[0032]: since the gate insulating film is formed of silicon dioxide, the gate insulating film has a characteristics of a compressive stress inducing material layer -- see *MPEP 2112: The claiming of a new use, new function or unknown property which is inherently present in the prior art does not necessarily make the claim patentable. In re Best, 562 F.2d1252, 1254, 195 USPQ 430, 433 (CCPA 1977); Where applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but the function is not explicitly disclosed by the reference, the examiner may make a rejection under both 35 U.S.C. 102 and 103, expressed as a 102/103 rejection. "There is nothing inconsistent in concurrent rejections for obviousness under 35 U.S.C. 103 and for anticipation under 35 U.S.C. 102." In re Best, 562 F.2d 1252, 1255 n.4, 195 USPQ 430, 433 n.4 (CCPA 1977)) over a first side of a substrate (1);*

forming a refractory metal silicide (6,7, fig 1(B), text paragraph [0036]) on the compressive stress inducing material layer, the refractory metal silicide comprising a first crystalline phase; and

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after forming the refractory metal silicide comprising a the first crystalline phase, annealing the compressive stress inducing material layer and the refractory metal silicide comprising a first crystalline phase to form a refractory metal silicide of a second crystalline phase (6,7, fig 1(D), text paragraph [0039]-[0040]).

- With respect to claim 55 and 58, Kawamura et al (text paragraph [0036] and [0040]) discloses the first crystalline phase is C49 and the second crystalline phase is C54.
- With respect to claim 57 and 73, Kawamura et al (text paragraph [0036] and [0040]) discloses the refractory metal silicide comprises titanium silicide.

### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (703) 308-6172. The examiner can normally be reached on Monday-Thursday 8:00 AM - 7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr., can be reached on (703) 308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-3432 for regular communications and (703) 308-7725 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Thanhha Pham  
June 29, 2003

  
CARL WHITEHEAD, JR.  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800